REMARKS

This Response is submitted in response to the Office Action dated February 11, 2008. The Office Action objected to the Oath/Declaration; rejected claims 16-19, 21-26 and 28-30 under 35 U.S.C. §102(b); and rejected claims 20 and 27 under 35 U.S.C. §103(a). Claims 16-19, 21-26 and 28-30 are amended herein. Applicants respectfully submit that the rejections are improper or have been overcome, as set forth in detail below. A Request for Continued Examination ("RCE") is submitted herewith. The Commissioner is hereby authorized to charge deposit account 02-1818 for the RCE fee.

The Office Action again objected the Oath/Declaration because the joint inventor did not sign. However, Applicants submitted a Declaration along with the response to the previous Office Action, where the Declaration was signed by the second inventor Nozomu Mitsuyoshi on February 19, 2005. Accordingly, Applicants respectfully submit that both inventors have signed an Oath/Declaration and that the objection had previously been overcome, and request clarification regarding the maintained objection.

The Office Action rejected claims 16-19, 21-26 and 28-29 under 35 U.S.C. §102(b) and being anticipated by U.S. Patent No. 5,872,453 to Shimoyama et al. ("Shimoyama"). The Office Action also rejected claims 20 and 27 under 35 U.S.C. §103(a) as being obvious in view of Shimoyama. Applicants respectfully disagree with and traverse these rejections for at least the reasons below.

At the outset, Applicants note that although claim 23 is listed as being rejected for anticipation reasons, this rejection does not appear in the body of the Office Action. That is, the rejection of claims 24, 26 and 28-30 was addressed on page 3 of the Office action, the rejection of claim 16 was addressed on page 4, the rejection of claims 17 and 29 was addressed on pages 4-5, and the rejections of claims 18, 25 and 21-22 were addressed on pages 5-6. However, it does not appear that claim 23 was addressed. Moreover, Applicants note that claim 30 is listed as being objected to on the summary page, but this objection does not appear to be maintained in the body of the Office Action. Applicants respectfully request clarification regarding same.

Of the rejected claims, claims 16, 24, 26 and 28 are the sole independent claims. Amended independent claim 16 recites, at least in part, a battery remaining capacity calculating

method for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery. The method includes: measuring an output voltage value of said secondary battery; dividing a *battery capacity consumption mode* of said secondary battery into a *high consumption rate mode* in which the output voltage value is not lower than a voltage threshold value and a *low consumption rate mode* in which the output voltage value is lower than the voltage threshold value; calculating a remaining capacity in said low consumption rate mode on a basis of a predetermined *nonlinear* reference voltage curve as a discharge characteristic of said secondary battery and said output voltage value; and calculating a remaining capacity in said high consumption rate mode supposing that there is minimal change in the remaining capacity at a time of change from said low consumption rate mode to said high consumption rate mode, *wherein determining the battery capacity consumption mode is independent of a temperature of the secondary battery.*

Independent claim 24 recites, at least in part a battery remaining capacity calculating device for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery. The device includes: voltage measuring means for measuring an output voltage value of said secondary battery; and arithmetic means for performing information processing, a reference voltage curve as a discharge characteristic of said secondary battery being recorded in said arithmetic means. The arithmetic means divides a *battery capacity consumption mode* of said secondary battery into a *high consumption rate* mode in which the output voltage value is not lower than a threshold value and a *low consumption rate* mode in which the output voltage value is lower than the threshold value. The arithmetic means calculates a remaining capacity of said secondary battery in said low consumption rate mode on a basis of the voltage value measured by said voltage measuring means and said reference voltage curve. Also, the arithmetic means calculates a remaining capacity in said high consumption rate mode on a basis of a reference remaining capacity as a remaining capacity before a battery capacity consumption mode change, a start voltage as an output voltage at a time of a start of the high consumption rate mode, a predetermined cutoff voltage of said secondary battery, and said output voltage value. *Determining the battery capacity consumption mode is independent of a temperature of the secondary battery.*

Independent claim 26 recites, at least in part a battery remaining capacity calculating device for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery. The device includes: voltage measuring means for measuring an output voltage value of said secondary battery; and arithmetic means for performing information processing, a reference voltage curve as a discharge characteristic of said secondary battery being recorded in said arithmetic means. The arithmetic means divides a *battery capacity consumption mode* of said secondary battery into a *high consumption rate mode* in which the output voltage value is not lower than a threshold value and a *low consumption rate mode* in which the output voltage value is lower than the threshold value. The arithmetic means calculates a remaining capacity of said secondary battery in said low consumption rate mode on a basis of the voltage value measured by said voltage measuring means and said reference voltage curve. Also, the arithmetic means calculates a remaining capacity in said high consumption rate mode on a basis of a voltage gap as an output voltage change at a time of a use mode change and said output voltage value. *Determining the battery capacity consumption mode is independent of a temperature of the secondary battery.*

Independent claim 28 recites, at least in part a battery remaining capacity calculating program for calculating a remaining capacity as a capacity of electricity dischargeable by a secondary battery. The program includes making a processor perform: a voltage measuring step of measuring an output voltage value of said secondary battery; a mode determining step of dividing a *battery capacity consumption mode* of said secondary battery into a *high consumption rate mode* in which the output voltage value is not lower than a threshold value and a *low consumption rate mode* in which the output voltage value is lower than the threshold value; a low consumption time remaining capacity calculating step of calculating a remaining capacity in said low consumption rate mode on a basis of a predetermined *nonlinear* reference voltage curve as a discharge characteristic of said secondary battery and said output voltage value; and a high consumption time remaining capacity calculating step of calculating a remaining capacity in said high consumption rate mode supposing that there is little change in the remaining capacity at a time of change from said low consumption rate mode to said high consumption rate mode. *Determining the battery capacity consumption mode is independent of a temperature of the secondary battery.* The amendments are supported in the claims and the Specification, for

example, at paragraphs [0047]-[0056]. Moreover, support for the amendments to claim 21 can be found, for example, in Fig. 4 and at paragraphs [0053] and [0064] of the Specification discussing the discontinuous change in voltage and the current change calculation step to determine a battery capacity consumption mode. Applicants respectfully submit that Shimoyama fails to disclose or suggest several elements of the amended independent claims, as discussed below.

As previously discussed, Shimoyama generally relates to a battery remaining capacity measuring apparatus that applies a first correction factor to the remaining battery capacity estimation if *the temperature* of the battery is low, or applies a second correction factor if *the temperature* of the battery is high. (See, Shimoyama, Fig. 6 and Abstract). Shimoyama incorporates a temperature sensor 5 for determining whether to apply a low-temperature correction factor, or a high-temperature correction factor. Accordingly, if the temperature of the battery in Shimoyama is a normal range (i.e., not too high or low) no correction factor is applied. That is, in the normal temperature range, it is not necessary to apply any correction factor from equations (2), (3), (4) or (5). (See, Shimoyama, col. 5, lines 25-67).

The Office Action asserts that Shimoyama discloses dividing a use mode of a secondary battery in a high mode in which the output voltage value is not less than (i.e., greater than or equal to) a threshold value, and a low consumption mode in which the output voltage value is lower than the threshold value. (See, Office Action, pg. 3). The Office Action also appears to allege that Shimoyama discloses dividing a use mode of a secondary battery based on an output voltage value because "dividing a use of mode (<u>which depends on the temperature</u>, since the battery voltage is proportional to the temperature..." (See, Office Action, pg. 4). While Shimoyama does disclose that "a battery voltage is inclined to decrease as a temperature drops" and that "when a temperature is high, a battery voltage is inclined to get higher," it does not disclose using an output voltage to divide the use mode of the battery. (See, Shimoyama, col. 1, lines 52-53 and col. 2, lines 1-2). In contrast to Shimoyama, the independent claims have been amended to clarify that the determination of the battery capacity consumption mode is <u>independent of a temperature of the secondary battery</u>. As discussed above, the focus of Shimoyama is to correct a battery capacity remaining calculation based on high or low temperature readings (i.e., the remaining capacity operation portion 19 includes a temperature

discrimination means 27, a low temperature pattern calculation means 31, and a high temperature pattern calculation means 29). (See, Shimoyama, Fig. 3).

In the present Specification, an example of a high consumption rate mode is when a portable telephone is in call mode (i.e., this requires a higher rate of power consumption from the battery). An example of a low consumption rate mode is when the portable telephone is in standby mode (i.e., this requires a lower rate of power consumption from the battery). As explained with reference to Figs. 2 and 4 of the present application, the relationship between the discharged capacity when the battery is in a low consumption mode (e.g., standby mode) and output voltage is different that when the battery in a high consumption mode (e.g., talk mode). However, due to the increased internal impedance of the battery when the battery switches from low consumption rate mode to high consumption rate mode, the output voltage decreases, as shown by the discontinuous voltage change in Fig. 4. (See also, [0055]). According to the presently claimed invention, when this change of use mode from low consumption to high consumption occurs (as is accompanied by the discontinuous drop in voltage due the increase in internal impedance), even though the voltage sharply drops, the arithmetic means calculates the remaining capacity assuming that the remaining capacity is the same as immediately before the change to a high use state.

Moreover, on page 9 of the Office Action, the Examiner has submitted that "a low consumption mode corresponds to an open circuit or no load whereas a high consumption mode corresponds to a load connected to the battery." However, as mentioned above, Shimoyama is not basing the battery capacity correction factor on whether the remaining battery capacity is being consumed at a high or low rate, but rather based on a temperature state of the battery.

For at least the reasons discussed above, Applicants submit that Shimoyama fails to disclose or suggest each of the elements of independent claims 16, 24, 26, 28, and dependents thereof.

Accordingly, Applicants respectfully request the withdrawal of the anticipation and obviousness rejections of claims 16-19, 21-26 and 28-30 based on Shimoyama.

For the foregoing reasons, Applicant respectfully submits that the present application is in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

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Dated: May 2, 2008